

BATH BRIDGE
National Covered Bridges Recording Project
Spanning Ammonoosuc River, Lisbon Road
Bath
Grafton County
New Hampshire

HAER NH-34
NH-34

PHOTOGRAPHS

PAPER COPIES OF COLOR TRANSPARENCIES

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

BATH BRIDGE

HAER No. NH-34

LOCATION: Spanning Ammonoosuc River, Lisbon Road, Bath, Grafton
County, New Hampshire
UTM: 19.262766.4894683 Moosilauke, NH Quad

DATE OF
CONSTRUCTION: 1832

STRUCTURAL
TYPE: Modified Burr truss

DESIGNER/
BUILDER: Unknown

PRESENT OWNER: Town of Bath

PREVIOUS &
PRESENT USE: Public road bridge since its construction

SIGNIFICANCE: Bath Bridge is a rare survivor of the early craftsman tradition of wooden truss bridge construction, before design became standardized into several major types based on patented plans. It is also of interest for its location in the midst of a well-preserved village center.

HISTORIAN: Joseph D. Conwill, Editor, *Covered Bridge Topics*, July 2002

PROJECT
INFORMATION: The National Covered Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is administered by the Historic American Buildings Survey/Historic American Engineering Record, a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

Chronology

1794	First bridge at Bath village
1831	Work begins on stonework for the present (fifth) bridge
1832	The covered bridge is completed
1852-53	White Mountain Railroad is constructed under the west end of the bridge
?	An extra pier is added under the long west span, turning the three-span bridge into a four-span bridge
1913	New Hampshire law requires bridges to be upgraded for 10-ton load
1918-19	Bridge is raised about 2', laminated arches are added, other major repairs done
1987-88	Restoration by Milton S. Graton

Bath and Its Early Bridges

Bath, New Hampshire was already a small industrial center in the 1790s before there was any bridge. The town voted in November 1793 to bridge the Ammonoosuc River “over the mill-pond above Mr. Sargent’s and Esq. Hurd’s mills.” Built in 1794, the cost was still given in the British system as 110 pounds total, which equaled \$366.66.¹ It lasted until taken out by an ice jam, but the town voted in 1806 to replace it, and this time the cost was quoted in American dollars at \$1,000.² A third bridge, built in 1820, was washed out in February 1824 and again replaced. By 1827, repairs were already needed, and Caleb Hunt was selected to supervise the project. The fate of this fourth bridge is unknown.³

Construction of the Present Bridge

A town meeting in March 1830 discussed rebuilding the bridge at Bath village, but postponed action, probably because of expenses just incurred during construction of the Bath-Haverhill Bridge at Woodsville. In March 1831, the town meeting returned to the question. Voters approved \$1,400 to cover contracts for stonework that apparently had already been negotiated and decided to proceed with construction of the two abutments and two center piers. George Wetherell was chosen as town agent for the project, but most regrettably there is no record anywhere of the builder’s name. The 1831 meeting also resulted in a vote to procure timber and have it delivered to the site over the upcoming winter. A special meeting later in the year on November 16 voted \$400 more towards construction of the stonework; evidently construction was already in progress and the available funds had been used up.⁴

The March 1832 town meeting raised a final \$1,500 to complete Bath Bridge, and this was probably for the wooden trusswork. Total cost was therefore around \$3,300.⁵ The work seems to have been completed to satisfaction, because the March 1833 town meeting chose William V. Hutchins as agent “to prosecute all persons who shall violate the law in crossing said Bridge, & to procure Bords [sic] lettered and placed at the ends of said Bridge giving notice of a fine for those who violate the law in crossing.” A sign on the west portal still warns of a ONE DOLAR FINE TO DRIVE ANY TEAM

¹ Rev. David Sutherland, *Address Delivered to the Inhabitants of Bath...with an Historical Appendix by Rev. Thomas Boutelle* (Boston: Geo. C. Rand & Avery, 1855), pp. 72-73.

² In some New England localities, money continued to be quoted in pounds, shillings, and pence even into the early nineteenth century, although dollar decimal coinage had been in circulation since 1794.

³ Brian R. Pfeiffer, the historian who prepared the National Register nomination, which was approved in 1976, conjectures that fire destroyed the fourth bridge because there was much discussion of fire laws at the 1830 town meeting. This may be true, but this author does not find the evidence compelling, especially since Sutherland makes no mention of a fire.

⁴ Bath Town Records, Volume 4. The years 1827-1839 were consulted. Available at the New Hampshire State Library, Concord, New Hampshire.

⁵ Some writers have quoted a cost of \$2,900, but they missed the \$400 expenditure voted on November 16, 1831.

FASTER THAN A WALK ON THIS BRIDGE. Such signs were still common on New England covered bridges well into the twentieth century. The “walk,” of course, refers to a horse’s gait; a gallop or a trot sets up a regular vibration capable of shaking truss bridge members loose and causing serious damage.

In the nineteenth century, winter transportation was by sleigh or sled over frozen snow. Roads were rolled to make them passable; snow plowing and removal did not begin until the 1920s after automobiles arrived. Covered bridges were obstacles in such a transportation system. They were covered to keep the wooden trusses from rotting, not to keep the snow off in the winter. Bath town meeting minutes of the 1830s show that the highway surveyor (i.e. road commissioner) of the village district had to oversee snow being placed on the bridge deck in winter and cleaned off come spring.⁶

Structural Details

The abutments and two original center piers of Bath Bridge are of dry-laid stone, but their orientation is odd. The two abutments are more or less square to the river, but the two piers are both skewed. This makes the span lengths different from one side of the bridge to the other and presented obvious challenges in framing the trusses. Moreover, the original span lengths were very uneven; the two piers are spaced closely together in the middle of the river. There is no obvious explanation for this peculiarity. Perhaps subsurface conditions for foundations dictated the placement of the piers, or there may have been some special problems regarding the flow of the river’s current.

The total truss length of Bath Bridge measures 374’-5 3/4” at the floor. Structure length of the east span is 127’-2 1/4” on the upstream side. The downstream side was not measured, but is two panels longer because of the skewed pier. From the position of the truss center posts in relation to the highest point of the arch, it is evident that the builder intended the upstream truss to be the standard and the downstream truss to be the deviation. The center span is only 71’-10” in structure length, while the long original west span was 175’-5 1/2”. Here the downstream truss measures three panels shorter, so this pier appears to be more skewed than the other. Where the short center span meets the long original west span, the builder had trouble fitting his panel lengths to the piers, so there is an odd short panel.

Posts and braces show manufacturing variation, but on average measure 4-1/2” x 5-3/4”. The braces do not foot on shoulders on the posts in the same plane. Instead, they are treenailed across the outside of the post frame with a single 1-3/4” treenail at the joint and no mortise. They overlap the panel points and continue on to the chords, where they are mortised through. The chords themselves are built up of three vertical leaves, with posts mortised through the inside joint and braces mortised through the other. This framing

⁶ Records from other New England towns describe “snowing” covered bridges in winter, but there are no known photographs of the operation in progress. Two Maine Highway Commission photographs from the early 1920s do show covered bridge interiors with snow on the deck.

detail is surprisingly similar to the counterbrace treatment developed a decade later by Peter Paddleford of nearby Littleton, but there is no evidence connecting him with Bath Bridge.

Bath Bridge also has original timber arches integral with the trusses. Like the chords, they are built up of three vertical leaves of timber placed together with no space; the posts are mortised through the inside joint, and the braces are mortised through the outside joint. The arch ends are tied to the lower chords and do not foot directly on the abutments. Such intricate joinery requires an almost unthinkable amount of custom labor.

Bath Bridge represents the early, idiosyncratic craftsman tradition of wooden truss bridge building, before designs became more standardized under the influence of the major patented truss plans. It is very difficult to classify. It is more like a Burr truss than anything else, but the standard Burr does not have the braces overlapping the panel points, and it usually has the arch footing directly on the abutments. Because of the overlapping braces, Bath Bridge slightly resembles the Haupt truss, but this was not patented until 1839, and the 1832 date for Bath Bridge is very well established.

One other New England covered bridge shares the same truss plan, the Sayres Bridge over Ompompanoosuc River at Thetford Center, Vermont. The framing details are rather similar, but the timber sizes are different, and the brace/post joints are made with two treenails, not one as at Bath. These two bridges may be the last remnants of an old regional building tradition, but neither date nor builder are known for Sayres Bridge.⁷ It is often inaccurately listed as a Haupt truss.

Other Framing Details

Bath Bridge is unusually wide inside, measuring 22'. Of this, about 18' is the roadway, and about 4' is a separate raised sidewalk platform along the upstream side. It is impossible to tell whether the bridge had this feature as originally built.

The floor beams measure about 7-1/2" x 15-1/2" but are not original. There are two per panel, and as the panel spacing is only about 4', the floor beams are numerous.

Like other New Hampshire covered bridges, Bath Bridge has been modified over the years, especially during the early twentieth century.

Repair Record

⁷ Sayres Bridge also has an extra post at the center, which Bath Bridge does not have. Some believe that the former Pattersonville Bridge of Norwich, Vermont, was a third example of this regional style, but it seems instead to have been a true Haupt truss, and thus a later structure.

In 1852, the White Mountain Railroad was graded along the west bank of Ammonoosuc River underneath Bath Bridge. Rails were laid, and service began in 1853.⁸ Apparently the bridge required no structural modifications at the time, but since steam engines passed closely under it for about a century, it is fortunate that it never caught fire. At some unknown time, the railroad installed sheet metal under the bridge in the area of the tracks to prevent sparks from lodging.⁹

The addition of a third pier later divided the long west span of Bath Bridge into two, making it a four-span bridge. There is no evidence documenting when this was done, but it was probably during the nineteenth century since the new pier is dry-laid stone and difficult to distinguish from the two originals. Had the pier been added when the laminated arches were installed in 1918-19, it would surely have been of concrete.

By a 1913 act of the New Hampshire legislature, bridges were to be made safe for 10-ton loads after April 1, 1915.¹⁰ The law created a tremendous burden for small towns, and compliance was slow. Bath Bridge at the time was posted for 2 tons. Concerned, the town asked famed bridge engineer John W. Storrs of Concord for an opinion. He said that the bridge had probably carried more than 2 tons but recommended that the posted load not be exceeded.

At a 1918 town meeting, Bath voted funds "for extraordinary repairs on Bath bridge." It was suggested to raise \$1,000 by taxation and finance the rest. Mr. C.C. Battey, recommended by engineer Storrs, presented an estimate covering various options. Later, when the work was done, he inspected it, but it is unclear how much he did himself, if any.

By 1919, the bridge straightening project had cost \$7,076.61. This was more than foreseen, but more work had been required. Among other things, the railroad decided that the bridge should be raised 2' higher over the tracks and paid for the actual raising, but various expenses such as regrading the road had to be covered by the town.

Work got underway in 1918 when Cyrus Batchelder repaired a flood-damaged pier and cut skewbacks and cut skewbacks into the old piers and abutments to receive laminated arches. The stonework also received concrete caps so that the bridge could be raised. Some 70,000 board feet of lumber of all kinds went into the project. The arch planks appear to have been hemlock. Much red and yellow pine was used, probably for the floor system.

Twelve or thirteen leaf laminated arches went into the easterly three spans, but the west span, over the railroad tracks, did not get a new arch. At some point, wooden horses

⁸ Sutherland, p. 74.

⁹ Richard G. Marshall, *New Hampshire Covered Bridges: A Link with our Past* (Concord: New Hampshire Department of Transportation, 1994), p. 53.

¹⁰ *Annual Report of the Town Officers*, 1915, p. 25. Information in the following paragraphs comes from the same source for 1918 and 1919.

were added to either side of the tracks; these may have been part of the same project in lieu of arches. The new arches were connected to needle beams under the lower chords of the truss by means of hanger rods on spacing varying from 8'-0" to 8'-6". The new arches and needle beams relieved some of the load from the trusses, but there is no direct connection to the floor system, as is usually done.¹¹

Photographs dating as late as ca. 1950 show the west portal of Bath Bridge with a semi-elliptical arched entry, housed in narrow clapboards, similar to portals found on Peter Paddleford's bridges. Soon thereafter the entry was squared off higher to allow more clearance, and the older configuration has never been restored. The east portal was so modified decades earlier.

Milton S. Graton

By 1987, Bath Bridge was in need of major repairs, and the job went to Milton S. Graton of Ashland, New Hampshire, one of the premier bridge wrights of the twentieth century.¹² There was a low interior boarding like a wainscot, which Graton removed. He found many posts badly gnawed, and several were chewed all the way through. Local legend stated that residents had once used the bridge as a stable to tie up their horses while uphill at the village church or at saloons, and the restless horses had chewed the posts. This practice may have been very old, for the 1834 town meeting entrusted the agent who enforced the speed limit with keeping the bridge clear from "horses or cattle or anything else which shall have a tendency to injure the people who may cross."¹³ Graton's preferred practice was to leave original members in place, sistering new ones alongside to preserve the historic fabric.

The interior wainscot was perhaps intended to prevent future horse damage, but this danger was long past and Graton did not replace it. Later the town reinstalled it, although this makes it impossible to inspect and clean around the lower chords. Covered bridges always collect dust, which, by retaining moisture, can cause rot. Old town records throughout New England show small expenditures for ongoing maintenance, including cleaning and sweeping, but in recent decades most towns have neglected this important detail.

Graton completed restoration in early 1988. Other work included reinforcing the arch ends where they are tied to the truss, and reroofing the bridge. Much rot had to be repaired over the former railroad tracks where the spark-arresting layer of sheet metal trapped moisture.

¹¹ Some of the laminated arches have extra leaves, apparently added at a later date. It is not known when this was done, but it was not part of the Graton restoration of 1987-88.

¹² Graton is pronounced with a long "a." Information on the restoration comes from David W. Wright of Westminster, Vermont, president of the National Society for the Preservation of Covered Bridges. He visited Bath regularly while the work was in progress.

¹³ Jonathan Smith was agent in 1834. The position seems to have been that of a special constable.

Bath Bridge today is in generally good condition and carries a moderate load of local traffic. There is a small sag in the second span from the west, the cause of which should be investigated.

Bath Village

Old accounts refer to Bath “Lower Village” and “Upper Village.” Downtown Bath, with the covered bridge, is the Lower Village. The Upper Village today is a lovely collection of late Federal homes, located about a mile and a half north of downtown. There is no church or store.

In addition to the famous covered bridge, Bath “Lower Village” includes a church with an unusual shingled steeple that usually appears black in photographs and an old brick general store. There were sawmills and gristmills even before the construction of the first bridge and a dam.¹⁴ Early in the nineteenth century, the village also saw the activity of an iron forge, and probably also a woolen mill, later a dye house.

In 1872, Conant and Company built a pulp mill just downstream from the covered bridge. This later became the Bath Lumber Company sawmill. Cushman-Rankin Company built a leather board mill on the site, which a fire destroyed in 1952. In 1953, Bath Fiber Company built a heeling board mill. A fire destroyed this in 1975 after the bridge sat vacant for some time.¹⁵ The power dam is still intact just downstream from the covered bridge and makes for a spectacular view.

Bath Bridge was the last covered bridge in North America to span railroad tracks.¹⁶ The tracks themselves are gone, but the roadbed remains, along with a telltale north of the bridge.¹⁷ On the old roadbed nearby is an old Boston & Maine caboose converted to a residence. The blue enamel sign saying BATH on the portal of the bridge is probably of railroad origin. With some imagination, it is still possible to see Bath as a small industrial village served by the White Mountain Railroad, with a magnificent covered bridge at its heart.

¹⁴ *Historical Notes of Bath, New Hampshire 1765-1965* (Bath: Town-Bicentennial Committee, 1965), pp. 5 ff.

¹⁵ Christine Schultz, “The Price of History in New Hampshire,” *Yankee* (December 2001), pp. 34-38. Thanks to Sarah Dangelas for bringing this source to my attention.

¹⁶ Of course, it mainly served to cross Ammonoosuc River. There were several covered bridges built solely to cross railroad tracks. Notable examples stood at East Deerfield, Massachusetts; Troy, New York; and Allentown, Washington.

¹⁷ A telltale is a row of strips hanging from a frame over the railroad track, intended to warn a brakeman on top of a car of the approach of a low bridge or tunnel entry.

Bibliography

Annual Report of the Town Officers [Bath], 1912-1931.

Bath Town Records, 1827-1839.

Field notes. Bath, New Hampshire, June 18, 2002; Thetford Center, Vermont, June 22, 2002.

Historical Notes of Bath, New Hampshire 1765-1965. Bath: Town Bicentennial Committee, 1965.

Marshall, Richard G. *New Hampshire Covered Bridges: A Link with our Past*. Concord: New Hampshire Department of Transportation, 1994.

Pfeiffer, Brian R. National Register of Historic Places, Nomination Form for Bath Covered Bridge, September 1, 1976.

Schultz, Christine. "The Price of History in New Hampshire." *Yankee* (December 2001), pp. 34-38.

Sutherland, Rev. David. *Address Delivered to the Inhabitants of Bath...With an Historical Appendix by Rev. Thomas Boutelle*. Boston: Geo. C. Rand & Avery, 1855.

Wright, David W., President of the National Society for the Preservation of Covered Bridges, telephone interview, June 16, 2002.